ICC-ES Evaluation Report

ESR-2778

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This report is subject to re-examination in two years.

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 32 16—Concrete Roof Tiles

REPORT HOLDER:

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EVALUATION SUBJECT:

BARTILE EXTRUDED CONCRETE ROOF TILES

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Roof covering
- Fire Classification
- Wind Resistance

2.0 USES

The Bartile extruded concrete roof tiles, when installed in accordance with this report, are used as a Class A roof covering.

3.0 DESCRIPTION

Bartile Extruded Concrete Roof Tiles are available in European, Mission "S" and Flat styles. Flat tiles are available in shake and slate designs. The tiles comply with ASTM C 1492 and are $15^1/_4$ inches long by $10^1/_2$ inches wide (387 mm by 267 mm) and have $1^1/_8$-inch to $1^1/_4$-inch (28 mm to 32 mm) interlocking double tongue-and-groove side laps. The tiles also have anchor lugs at the bottom intended for installation over wood furring strips. The lugs are typically $^1/_2$ inch (13 mm) deep, $1^1/_2$ inches (38 mm) wide and $^5/_8$ inch (16 mm) thick. The tile thickness varies from $^1/_2$ inch (13 mm) to 1 inch (25.4 mm) at the ribs. Accessory tiles in each style are available for rakes, ridges and hips.

The tiles are available in both standard-weight and lightweight varieties for each style. They vary only in weight due to the lightweight tiles being produced using crushed lightweight shale in place of sand.

When installed with a standard 3-inch (76 mm) head lap, the following are the approximate installed weights:

DESCRIPTION	INSTALLED WEIGHT (pounds per square foot)	
	Standard-weight Tiles	Lightweight Tiles
European	9.5	7.5
Mission "S"	9.5	7.5
Flat (Shake and Slate)	10.25	8.0

See Figure 1 for details.

4.0 INSTALLATION

4.1 General:

On roof slopes of less than 3:12, the tiles are only considered as decorative and must be applied over a roof covering approved by the code official.

4.2 Standard-weight Tiles:

On roof slopes of 3:12 to 24:12 (25 to 200 percent), the tiles are installed over a minimum $^7/_{16}$-inch-thick (11.1 mm) solid oriented strand board sheathing or $^{15}/_{32}$-inch-thick (11.9 mm) solid plywood sheathing, placed with a minimum 3-inch (76 mm) head lap. Underlayment must comply with IBC Section 1507.3.3, IRC Section R905.3.3 or UBC Tables 15-D-1 or 15-D-2, as applicable. Nominally 1-by-2 cedar or fir wood strips or metal hat channel perpendicular to the eaves may be optionally used on slopes between 4:12 and 6:12 (33 and 50 percent). Nominally 1-by-2 wood battens, plastic battens recognized in evaluation report ESR-2482, or metal hat channels are laid parallel to the eaves and spaced a maximum of $12^1/_4$ inches (311 mm) on center. Battens are attached with 8d, common corrosion-resistant nails spaced 24 inches (610 mm) on center. Nails used to attach battens must be of sufficient length to penetrate 1 inch into or through the sheathing, whichever is less. A minimum $^1/_2$-inch (13 mm) space is provided between the ends of battens every 4 feet (1219 mm) to allow for water drainage.

Ridge, hip and rake tiles are attached with minimum 8d, common corrosion-resistant nails. All tiles must have a minimum 3-inch head lap, and vertical edges must be interlocked and staggered from adjacent courses.

On slopes of 3:12 to 24:12 (25 to 200 percent), 1-inch-by-6-inch (25.4 mm by 152 mm) spaced sheathing, grade marked in accordance with the applicable code and installed at a maximum of 12 inches (305 mm) on center, may be used. When installation is on spaced sheathing, an underlayment recognized specifically for this type of use in a current ICC-ES evaluation report must be installed with 6-inch side and head laps.

Tiles are nailed to battens with No. 11 gage, corrosion-resistant roofing nails in accordance with the applicable code. Nails must be of sufficient length to penetrate $^{3}/_{4}$ inch (19 mm) into or through the thickness of the supporting member, whichever is less. Rake and coping tiles are fastened with two nails. For field and perimeter nailing schedules, see, as applicable, IBC Section 1507.3.7, IRC Section R905.3.7, and UBC Tables 15-D-1 and 15-D-2. In jurisdictions enforcing the IBC and the IRC, flashing must comply with IBC Section 1507.3.9 or IRC Section R905.3.8 as applicable. For jurisdictions enforcing the UBC, the flashing must comply with UBC Sections 1508.4 and 1509. See Figure 2 for installation details.

4.3 Lightweight Tiles:

Lightweight tiles are installed in the same manner as standard-weight tiles, except that each tile is attached with No. 11 gage, corrosion-resistant roofing nails.

4.4 Wind Resistance:

4.4.1 IBC: Installation of the concrete roof tiles is limited to buildings having a maximum mean roof height of 60 feet (18.3 m), in areas having a maximum basic wind speed (3-second gust) of 100 mph (161 km/h).

4.4.2 IRC: Installation of the concrete roof tiles is limited to buildings having a maximum mean roof height of 40 feet (12.2 m), in areas having a maximum basic wind speed (3-second gust) of 100 mph (161 km/h).

4.4.3 UBC: Installation of the concrete roof tiles is limited to Exposure B areas where the maximum basic wind speed (fastest mile) is 80 mph (129 km/h) on structures having a mean roof height of 40 feet (12.2 m) or less.

4.5 Fire Classification:

4.5.1 New Construction: When installed in accordance with this report, the tiles are Class A roof coverings in accordance with the exception to Section 1505.2 of the IBC and with Section R902.1 of the IRC. The tiles are noncombustible roof coverings in accordance with Section 1504.2 of the UBC.

4.5.2 Reroofing Applications: The existing roof coverings must be removed and the new roof installed in accordance with the requirements of Section 1510 of the IBC, Section R907 of the IRC or Appendix 15 of the UBC, as applicable. The roof classification is as noted in Section 4.5.1.

4.6 Tile Replacement:

Damaged tile must be completely removed. Existing fasteners must be removed and the resulting hole must be cleaned and patched with a sealant specified by the manufacturer. The replacement tile must be set into place while maintaining the required head and side lap. The new tile must be secured using a roof tile adhesive recognized in a current ICC-ES evaluation report, applied to the bottom half of the replacement tile.

5.0 CONDITIONS OF USE

The Bartile extruded concrete roof tiles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The tiles are manufactured, identified, and installed in accordance with this report, the manufacturer's instructions, and the applicable code. In the event of a conflict between the manufacturer's instruction and this report, this report governs.

5.2 The roof sheathing and roof framing system must be designed for the appropriate loads determined in accordance with the applicable code, subject to the approval of the code official.

5.3 Underlayment must be used in all installations, and the maximum roof slope must not exceed 24:12 (200 percent).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Clay and Concrete Roof Tiles (AC180), dated August 2007.

7.0 IDENTIFICATION

The shipping pallets have labels bearing the name "Bartile," the style and color of the tile, the date of manufacture, the installed weight and the evaluation report number (ESR-2778). The lightweight tile labels also bear the words "LT. WT. Bartile."

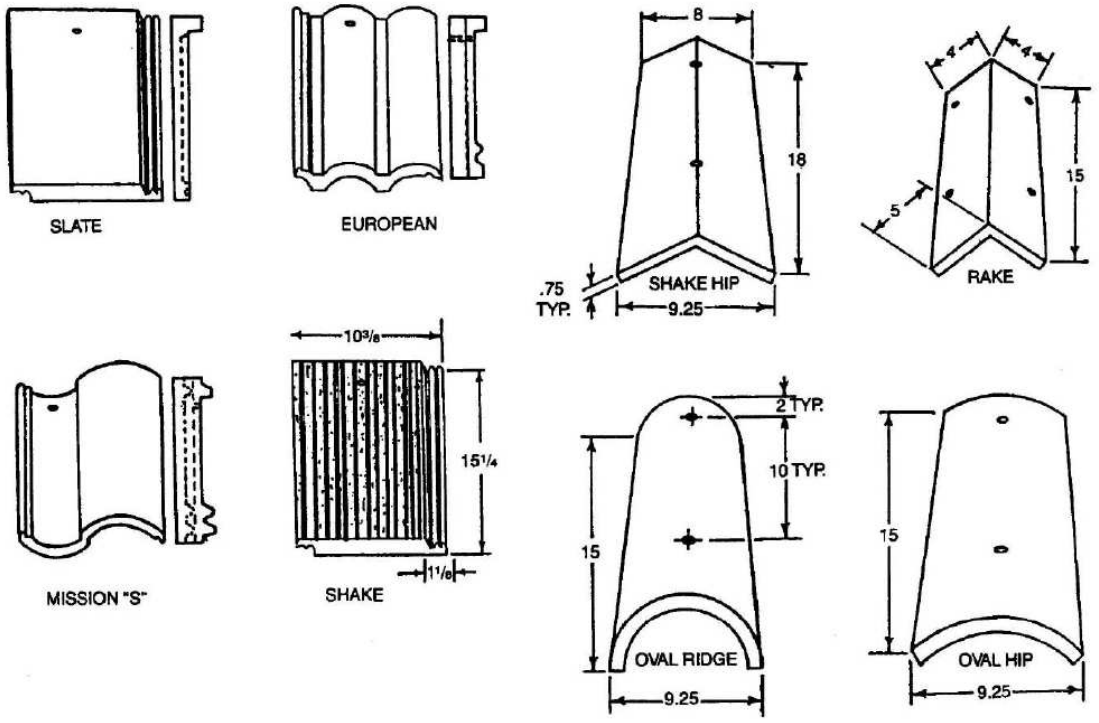

FIGURE 1

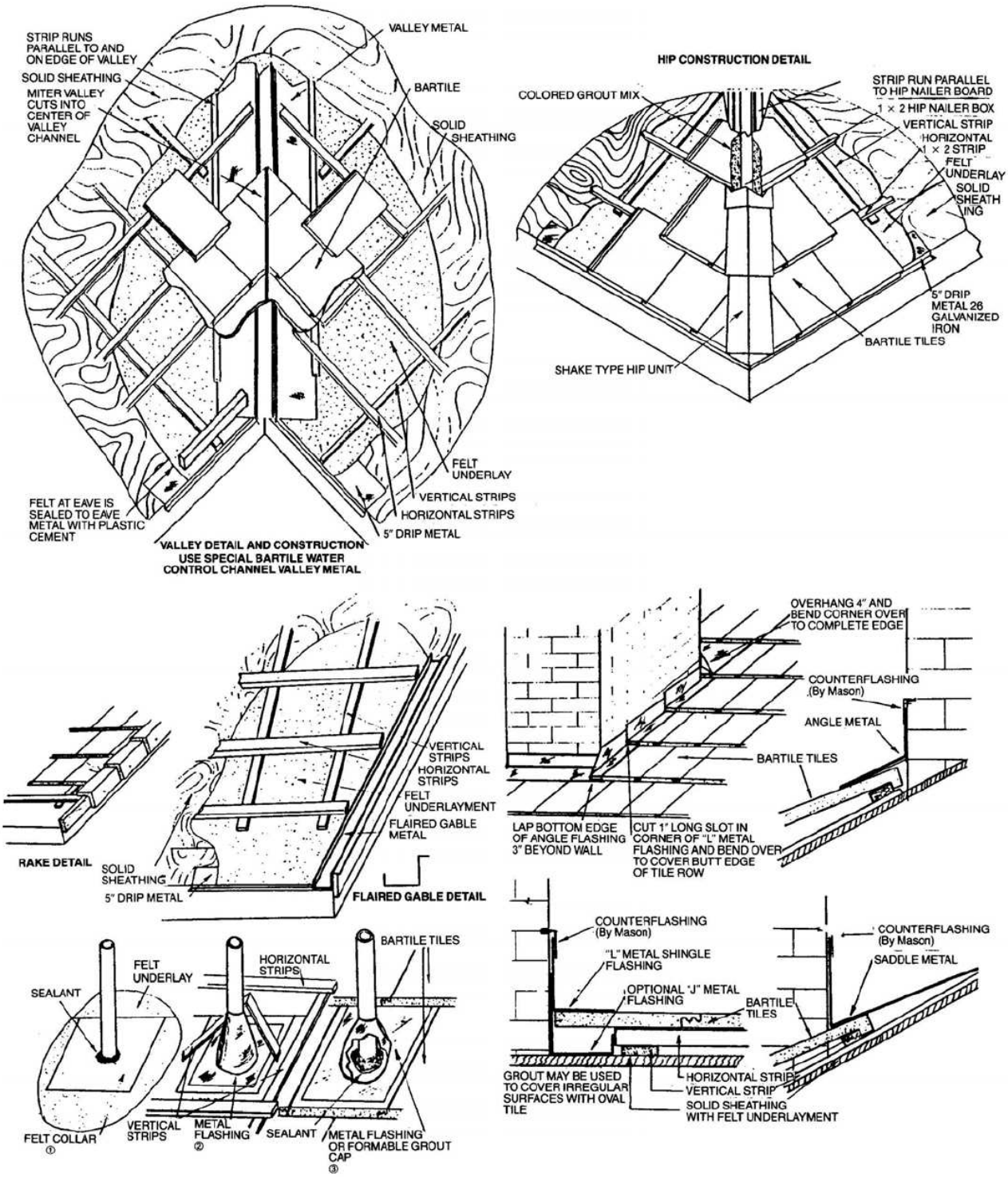
STRIP RUNS PARALLEL TO AND ON EDGE OF VALLEY
SOLID SHEATHING
MITER VALLEY CUTS INTO CENTER OF VALLEY CHANNEL
VALLEY METAL
BARTILE
SOLID SHEATHING
FELT UNDERLAY
VERTICAL STRIPS
HORIZONTAL STRIPS
5" DRIP METAL
FELT AT EAVE IS SEALED TO EAVE METAL WITH PLASTIC CEMENT
VALLEY DETAIL AND CONSTRUCTION
USE SPECIAL BARTILE WATER CONTROL CHANNEL VALLEY METAL
HIP CONSTRUCTION DETAIL
COLORED GROUT MIX
STRIP RUN PARALLEL TO HIP NAILER BOARD
1 × 2 HIP NAILER BOX
VERTICAL STRIP
HORIZONTAL 1 × 2 STRIP
FELT UNDERLAY
SOLID SHEATHING
5" DRIP METAL 26 GALVANIZED IRON
BARTILE TILES
SHAKE TYPE HIP UNIT
RAKE DETAIL
SOLID SHEATHING
5" DRIP METAL
VERTICAL STRIPS
HORIZONTAL STRIPS
FELT UNDERLAYMENT
FLAIRED GABLE METAL
FLAIRED GABLE DETAIL
OVERHANG 4" AND BEND CORNER OVER TO COMPLETE EDGE
COUNTERFLASHING (By Mason)
ANGLE METAL
BARTILE TILES
LAP BOTTOM EDGE OF ANGLE FLASHING 3" BEYOND WALL
CUT 1" LONG SLOT IN CORNER OF "L" METAL FLASHING AND BEND OVER TO COVER BUTT EDGE OF TILE ROW
FELT UNDERLAY
SEALANT
HORIZONTAL STRIPS
BARTILE TILES
FELT COLLAR ①
VERTICAL STRIPS
METAL FLASHING ②
SEALANT
METAL FLASHING OR FORMABLE GROUT CAP ③
COUNTERFLASHING (By Mason)
"L" METAL SHINGLE FLASHING
OPTIONAL "J" METAL FLASHING
BARTILE TILES
COUNTERFLASHING (By Mason)
SADDLE METAL
GROUT MAY BE USED TO COVER IRREGULAR SURFACES WITH OVAL TILE
HORIZONTAL STRIPS
VERTICAL STRIPS
SOLID SHEATHING WITH FELT UNDERLAYMENT

FIGURE 2